CLA-VAL **e-Drive-33**

Actuated Pilot Control 4-20 mA

User Manual

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1 INTRODUCTION

1.1 PRECAUTIONS BEFORE STARTING

 : Before commencing work on site, connect to our internet address in order to update your e-Drive-33 with the latest version of the software and firmware (chapter 3.5).

1.2 TROUBLESHOOTING

- **Diagnostic for the led**
  At start-up, the led remains red for 5 seconds, then switches to solid green.
- **Green**
  Status OK.
- **No light**
  Check power supply.
- **Red**
  Exceed the ***high torque*** limit - Power down and power up again. If problem persists contact CLA-VAL.
  Excess voltage (above 32 Volts).
- **Blinking red/green**
  Calibration was not completed correctly - recalibrate.
- **Changing a set-point without a command signal *with* an e-Drive - USB cable connected**
  1. Calibrate your range.
  2. Select **"Last position"** in loss of signal mode.
  3. Go to **"Display"** tab, select your milliamp value and tick the check box to activate.
- **Changing a set-point without a command signal *without* an e-Drive - USB cable**
  To increase or decrease the actuator, refer to wiring diagram in the user manual.
  To increase actuator connect the purple wire with the pink.
  To decrease actuator connect the turquoise wire with the pink.
  Note: If it returns to 4 mA or 20 mA, then the loss of signal mode was not in **"Last position mode"**.

1.3 GENERAL DISCLAIMER

In accordance with our policy of continuous development and improvement, CLA-VAL Europe reserves the right to modify or improve these products at any time without prior notice. CLA-VAL Europe assumes no liability or responsibility for any errors or omissions in the content of this document.

1.4 ENVIRONMENTAL PROTECTION

Help to preserve and protect the environment. Recycle used batteries and accessories.

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1.5 TYPOGRAPHY

Throughout this manual, the following typographical conventions and symbols have been adopted to help readability:

a. **"Bold":** Menu, command, tab and button.
b. ***BOLD ITALIC***: Important information.
c. (**1**): Number of the reference marks on image.
d. **www.cla-val.ch:** Internet address.
e.  : Some tips.
f.  : Warning!

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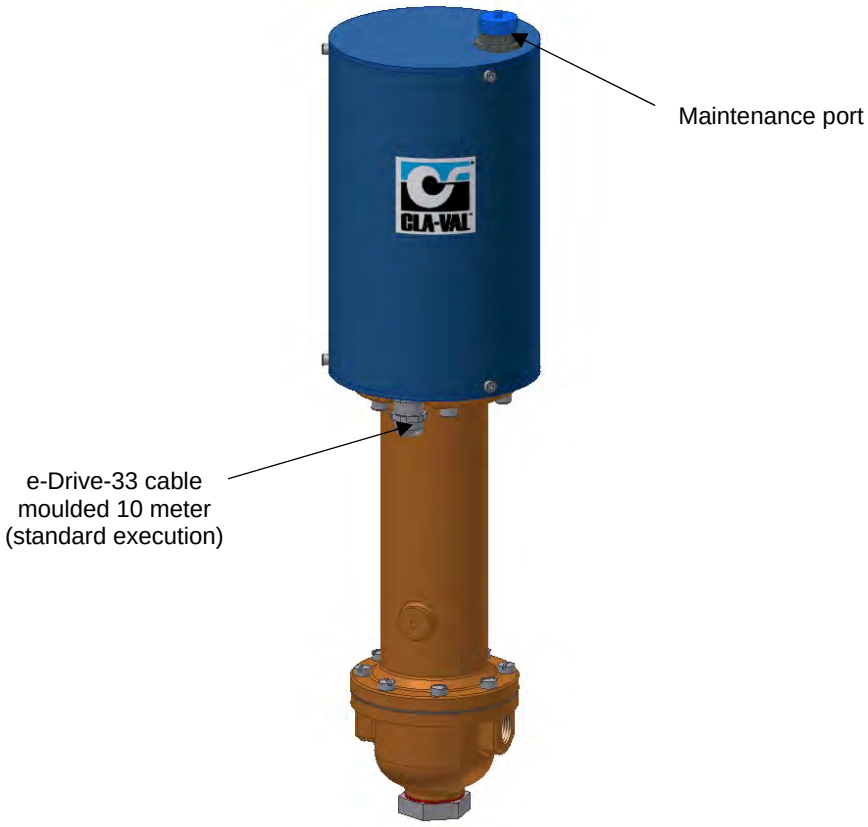
2 E-DRIVE-33 CHARACTERISTICS

Thank you for purchasing a CLA-VAL e-Drive-33. With appropriate care, this e-Drive-33 will provide accurate and reliable control of your valve for many years. The e-Drive-33 is built with the latest technology together with very high quality components.

The e-Drive-33 is a 4-20 mA standalone actuated control which is PC calibrated and able to remotely control any CLA-VAL valve. The pilot setting can be adjusted with a standard 4-20 mA signal and a 4-20 mA position feedback signal is available to cross check if the requested position is reached.

e-Drive-33 with pilot



Maintenance cable

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3 HOW TO USE THE E-DRIVE-33?

3.1 WIRING CONNECTIONS

Cable		
Code	Function	Colour
0 V	Connect with ground principal	black
+24 VDC	Power supply	red
+4-20 mA	Position Feedback	green
Common -	For position feedback & push button	pink
+4-20 mA-	Set point +	yellow
-4-20 mA	Set point -	grey
Alarm 1	Input low contact relay	brown
Alarm 1	Output low contact relay	blue
Alarm 2	Input high contact relay	orange
Alarm 2	Output high contact relay	white
Manual 1	Decrease position by push button	turquoise
Manual 2	Increase position by push button	purple

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3.2 E-DRIVE-33 TECHNICAL DATA

	Electrical Specifications
Electrical Power:	• 24 VDC, 6 rpm rated speed • 12 VDC, 3 rpm rated speed 300 mA max. load draw @ 20 bar 30 mA stand-by (no load draw)
Power Protection:	Max. 32 VDC over voltage Max. 800 mA torque load draw Reverse polarity & short circuit 80°C stop @ high temperature
Led display**:**	Green LED
Electrical connection:	Moulded 10 m cables
Input command:	• 4-20 mA (2 wires) • 2 x dry contact (manual positioning)
Input 4-20 mA Protection	Max. 32 VDC over voltage Optocoupler isolation @ CMR 1000 V (CMR: common mode rejection) Insulated (2 wires)
Output feedback:	• 4-20 mA (output charge ≤ 500 Ω) • 2 x programmable position alarms 24 VDC / 240 VAC up to 1 A max.
Output 4-20 mA Protection	Max. 32 VDC over voltage (The input dry contact and 4-20 mA output have the same common or earth but are not individually isolated)
	Other Specifications
Operating Pressure:	PN 16 bar standard
Temperature range:	-10°C to +80°C
Rating:	IP68 standard allowing full immersion (Solenoid, junction box, sensor, not included in IP68)
Interface:	Plug & Play / NT / 2000 / XP / Vista / Win 7
	Default mode
Troubleshooting:	Refer to user manual for LED diagnostics and codes: red-green-blinking
Remote command failure:	Options available: maintain current position, go to 4 mA position, go to 20 mA position

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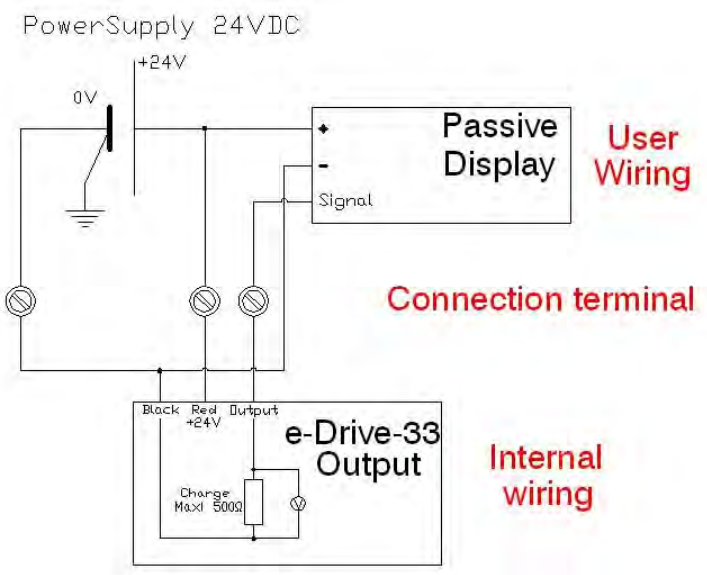
3.3 CONNECTION

Output:



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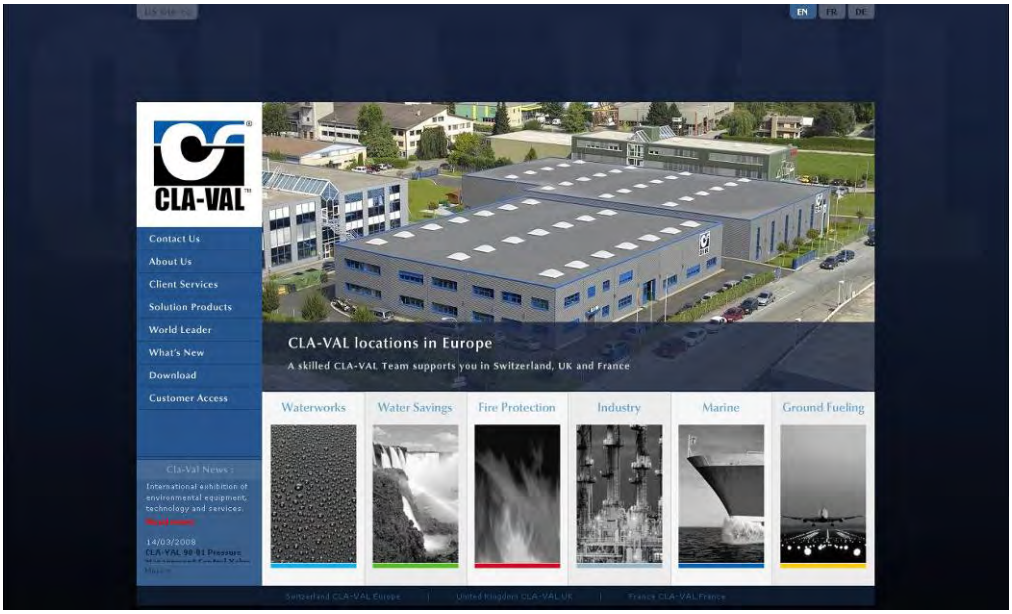
3.4 INSTALLATION INSTRUCTIONS

1- All installation, adjustment and maintenance should be carried out by a competent electrician.
2- Do not exceed the maximum ratings given in the specifications and printed on the label.
3- The electrical connections should be made as described in the user's manual.
4- Before any maintenance operation the main power should be turned off.

: Do not attempt to open the product as this will invalidate the warranty!

3.5 SOFTWARE / FIRMWARE UPDATE

For Software updates please visit our web site **www.cla-val.ch**:



Select **"download e-Line"**, you will find all the latest Software (PC) & Firmware (internal software) updates. Just click on the logo to download automatically.

All the software is multi-language, only the install Software is in French or English.

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3.6 FIRMWARE UPDATE (INTERNAL SOFTWARE)

: Before the Firmware update, save your program on your PC.

1- Connect the USB wire to the USB connection of your PC.
2- Connect the e-Drive-33 to the USB wire.
3- Select **"Read Parameters"** to read e-Drive-33 settings and record output parameters.
4- Select **"Firmware update"** in **"Parameters"**.
5- Open the corresponding "hex" file.
6- Select **"Read Parameters"** to check that the Firmware is updated.

3.7 USB DRIVER INSTALLATION

When you connect the e-Drive-33 cable for the first time, your PC will detect it and request a driver.

Windows 1

a. Select **"Cancel"**.
b. Install the "Multi-USB driver setup" software on your PC (you can download this software on internet **www.cla-val.ch**).
c. When you see this message below, select **"Continue Anyway"**.

Windows 3

Installation of the USB driver is now finished.

Windows 5

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3.8 UPDATE USB DRIVER OR INSTALL ON ANOTHER PORT

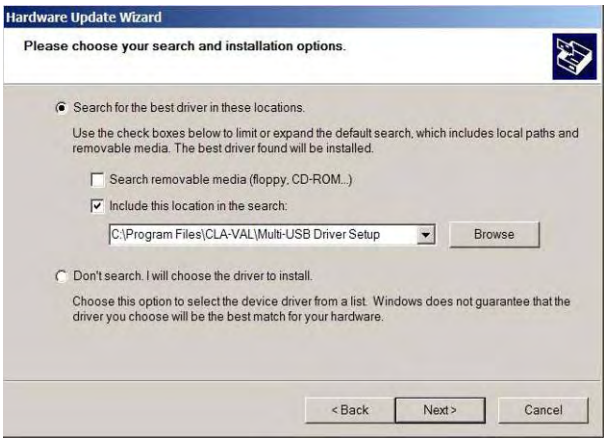
To update your USB driver, please follow procedure below. Install the software «Multi-USB Driver Setup» download from our web site **www.cla-val.ch**.

Connect your USB cable to your PC.

a. Select: **"Install from a list or specific location"**.

Windows-1

b. Browse to file: **C\Program Files\CLA-VAL\Multi-USB Driver Setup**.



Windows-2

c. Microsoft validation press **"Continue Anyway"**

Windows-3

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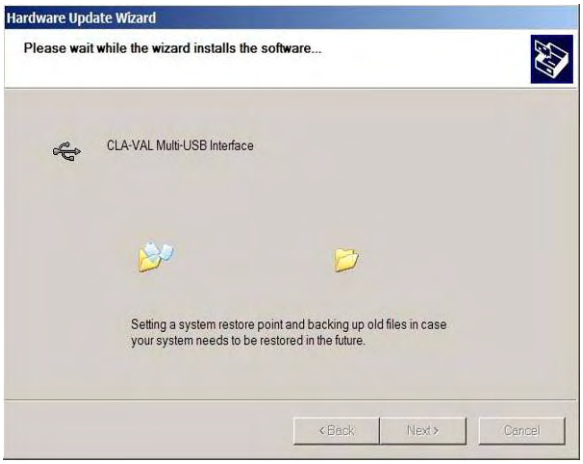
d. Installation.



Windows-4

e. Installation completed.

Windows-5

Visit our web site **www.cla-val.ch** frequently in order to download freely the latest update and news.

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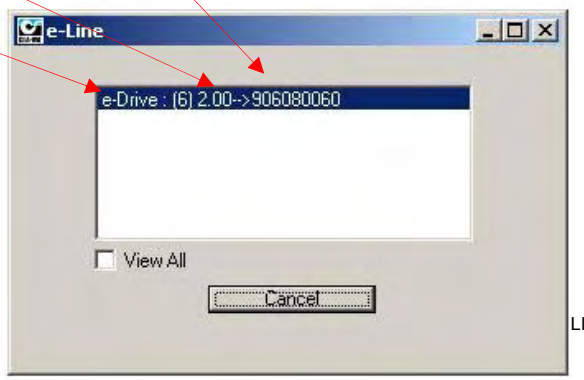
3.9 CONFIGURATION MODE

To launch e-Drive-33 / CPC software when not connected to your PC, the e-Line list (which allows the multi connection of e-Line products) is empty (see picture below), click **"Cancel"**.

GEN001

If you are connected to one or more e-Drive-33's or another e-Line product, click on **"View All"** then select the e-Drive-33 you would like to communicate with from the list (see picture below) then click once on left mouse button.

The name of product, Firmware version and serial number are displayed.



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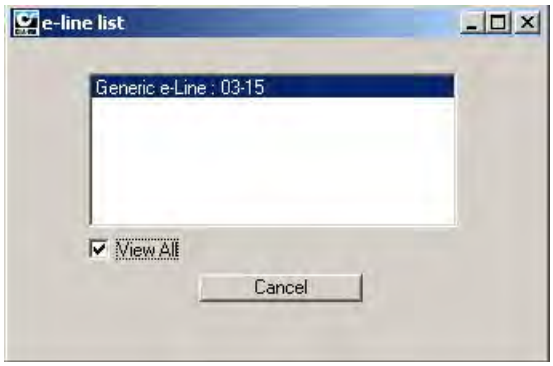
If your e-Line product isn't updated with the "Multi connection" version, the e-Line list stays empty. Click on **"View All"**, the e-Line product appears with name **"Generic e-Line"** (see picture below), then click once on left mouse button on this line to communicate with the product.

For the name and serial number of this product to appear, a Firmware update is necessary (see chapter 3.6).



GEN002

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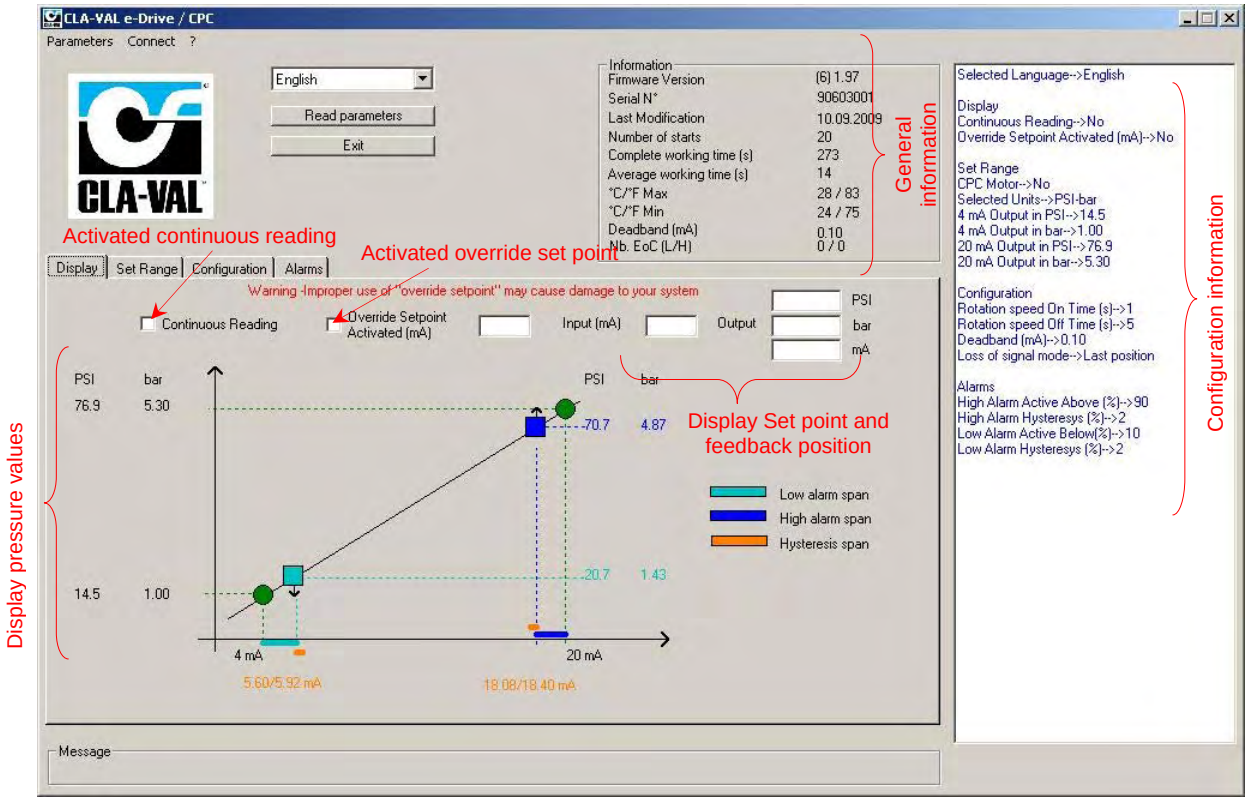
4 HOW TO CALIBRATE THE E-DRIVE-33?

4.1 DISPLAY



LIN039UE-01

Connect your PC to the e-Drive-33 with the USB cable.

1- Start the e-Drive / CPC CLA-VAL software.

2- Selected the e-Drive in the e-Line list.

3- Selected your language and click **"Read parameters"**.

4- On the right side the configuration information is displayed. On the top general information including the date of the latest calibration, the average & total working time since the first power up, the number of starts, the serial number, the Firmware version and the maximum and minimum recorded temperature is displayed.

5- Click on continuous reading if you would like see the position of e-Drive, set point (mA) and feedback position (mA and units).

6- If you would like to manually change the setting, write your setting and click on **"Override Setpoint"**.

Improper use of **"Override Setpoint"** may cause damage to your system

: a- Display configuration text colour is blue by default. If you amend any parameters, the text colour will change to black. To restore text to blue, select **"Read parameters"**.

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4.2 STATIC CALIBRATION MODE

During this process, **system pressures will not change** (or change slightly depending on the rounded number entered) when entering set-point values in order to complete the process. If you prefer to change the system pressures, use **"Dynamic Calibration"** mode.

The 'Set Range' window allows either 'Static' or 'Dynamic' calibration.

When you click on **"Set Range"**, you will see the message below.

If you would like to continue with calibration, click **"OK"**, if not click **"Cancel"**.

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Determine the pilot spring range. (Check nameplate label on pilot).

Calculate the pressure change per turn of pilot from the spring chart.

Calculate the number of turns between the reference pressure and desired low and high pressures.

1- Select **"Static Calibration"** Mode and ensure that the **"CPC Motor"** check box is unchecked (Disabled).

2- Select units.

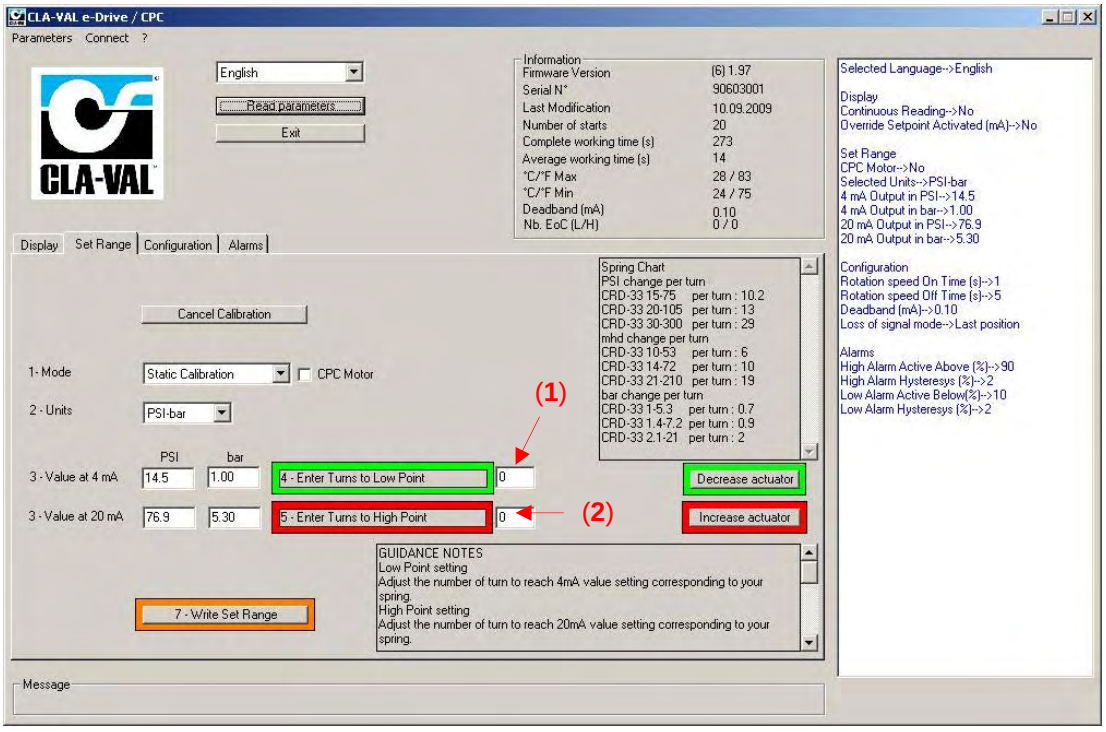
3- Enter these numbers into **"Value at 4 mA"** and to **"Value at 20 mA"** windows. Numbers must be positive and can have up to 2 decimal places.

4- From the values current pressure/flow, enter the number of turns to reach Low pressure/flow set-point (**1**).

5- From the values current pressure/flow, enter the number of turns to reach High pressure/flow set-point (**2**).

7- Click **"Write Set Range"** button to complete actuator setup.

Your e-Drive-33 is calibrated.



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Example program:

- Valve is in control operating at 45 psi (3 bar).
- The pressure at 4 mA is 30 psi (2 bar).
- The pressure at 20 mA is 60 psi (4 bar).
- From the spring chart, the pressure per turn is 9.1 psi (0.6 bar).

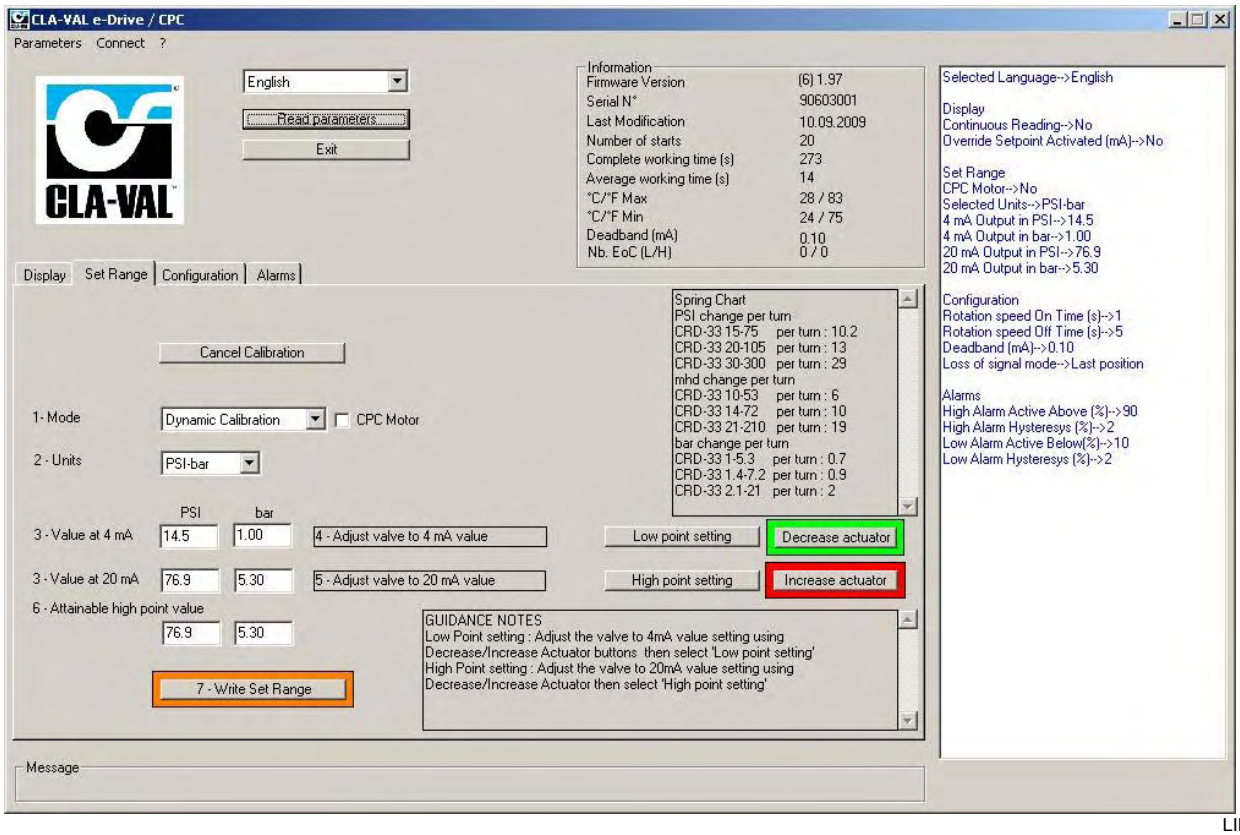
The number of turns to **Low set point** is equal to 45 psi (3 bar) minus 30 psi (2 bar) Divided by 9.1 psi (0.6 bar) = 1.65 turns.

The number of turns to **High set point** is equal to 60 psi (4 bar) minus 45 psi (3 bar) Divided by 9.1 psi (0.6 bar) = 1.65 turns.

4.3 DYNAMIC CALIBRATION MODE

During this process, **system pressures will be changed** from the minimum to maximum set-point values in order to complete the process. If it is not possible to change system pressures, use **"Static Calibration"** mode.

Now you are in the calibration, please follow the setting:



LIN039UE-03

1- Select **"Dynamic Calibration"** mode and ensure that the **"CPC Motor"** check box is unchecked (Disabled).

2- Select Units.

3- Enter the required setting Value at 4 mA point and Value at 20 mA point.

4- **"Low point setting".** Look at the pressure/flow on the gauge/display and use the **"Increase actuator / Decrease actuator"** button to decrease the pressure/flow until it reaches the low pressure/flow point. When the low pressure/flow point is reached, then click on the button **"Low point setting"**.

5- **"High point setting".** Look at the pressure/flow on the gauge/display and use the **"Increase actuator / Decrease actuator"** button to increase the pressure/flow until it reaches the high pressure/flow point. When the high pressure/flow point is reached, then click on the button **"High point setting"**.

7- When all values have been entered, click on **"Write Set Range"**.

Dynamic calibration is done.

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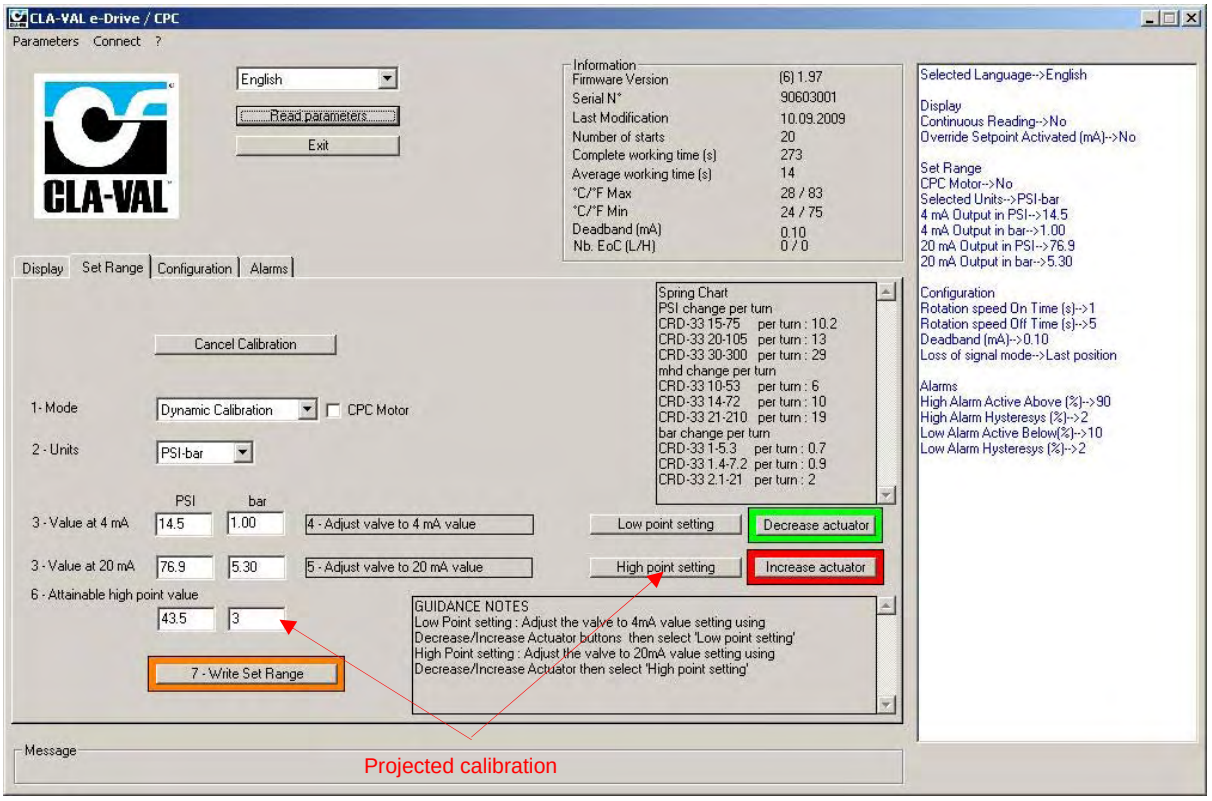
4.4 EXTENDED DYNAMIC CALIBRATION MODE: HIGH POINT VALUE

During this process, **system pressures will be changed** from the minimum to the chosen maximum set-point values in order to complete the process. If it is not possible to change system pressures, use **"Static Calibration"** Mode.



LIN039UE-04

If you can not physically reach the requested High pressure point, in this situation you have to follow the extended dynamic calibration mode:

1- Select **"Dynamic Calibration"** mode and ensure that the **"CPC Motor"** check box is unchecked (Disabled).

2- Select Units.

3- Enter the required setting Value at 4 mA point and Value at 20 mA point.

4- **"Low point setting"**. Look at the pressure/flow on the gauge/display and use the **"Increase actuator / Decrease actuator"** button to decrease the pressure/flow until it reaches the low pressure/flow point. When the low pressure/flow point is reached, then click on the button **"Low point setting"**.

5- Look at the pressure/flow on the gauge/display and use the **"Increase actuator / Decrease actuator"** button, in order to increase the pressure/flow until it reaches the high pressure/flow point. When the pressure does not increase any more then stop the actuator. Decrease the pressure/flow by a small amount, as soon as you see the gauge/flow changing stop again.

6- **"High point setting"**. Enter the indicated value in the projected calibration window **"Attainable high point value"** as described over, then click on **"High point setting"**.

7- When all values have been entered, click on **"Write Set Range"**.

Extended calibration is done.

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4.5 CONFIGURATION

The configuration tab sets the rotation speed and the deadband.

- **Rotation speed** affects the response time of the valve between set-points.

  The default condition is 1 second on-time, 5 seconds off-time achieving at rotation speed of 1.2 rpm.

  Make sure that the values entered are appropriate to your system to minimise potential for surge.

  Entering a '0' (zero) ON-TIME and '0' (zero) OFF -TIME will achieve a continuous rotation speed of 6 rpm (The maximum speed).

- **Deadband:** The default value is 0.1 mA which may need to be increased depending on the stability of the electrical signal.

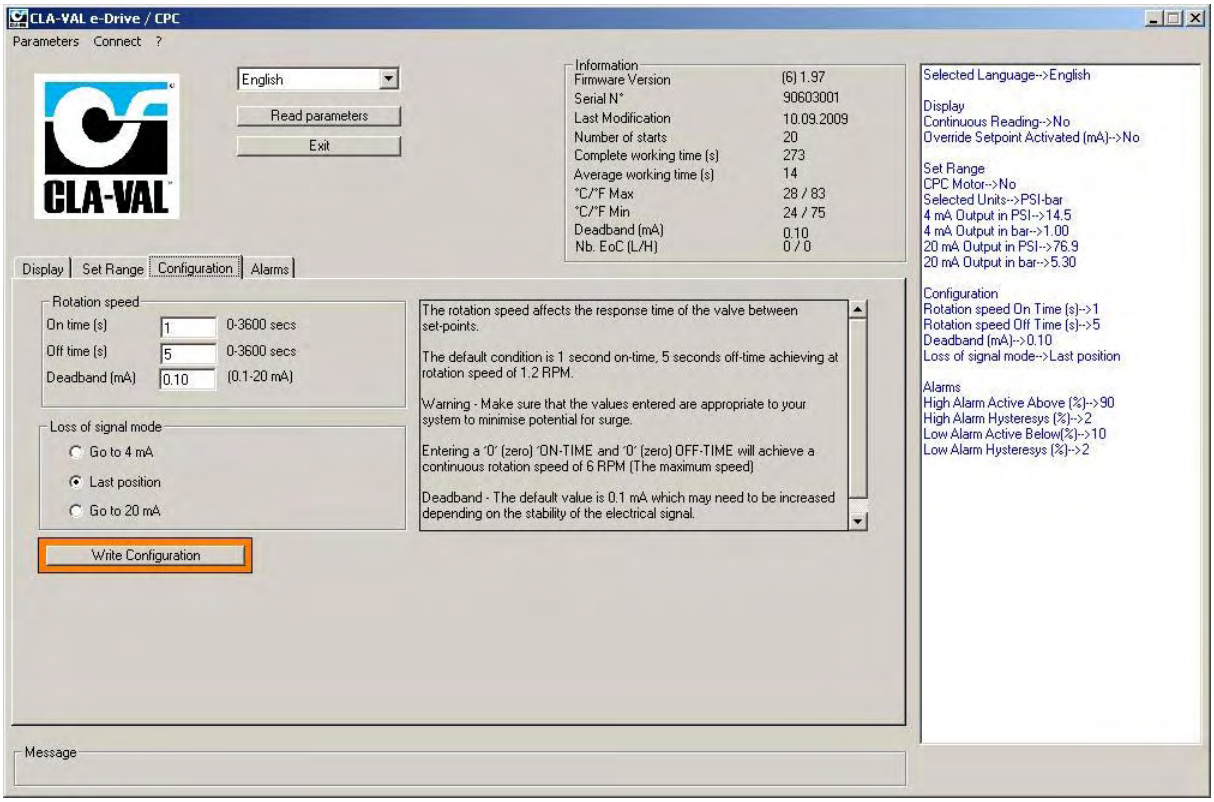
Choose the loss of signal mode:

- Go to 4 mA: e-Drive-33 will default to the 4 mA position (low set point).
- Last position: e-Drive-33 will maintain the last position.
- Go to 20 mA: e-Drive-33 will default to the 20 mA position (high set point).

Note: Loss of signal can occur on the SCADA system which generates the 4-20 mA command but at the same time the e-Drive-33 can stay powered, so it is important to select the right option.

When you have finished your configuration, click on **"Write Configuration"**.

Your e-Drive-33 is configured.



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4.6 ALARMS

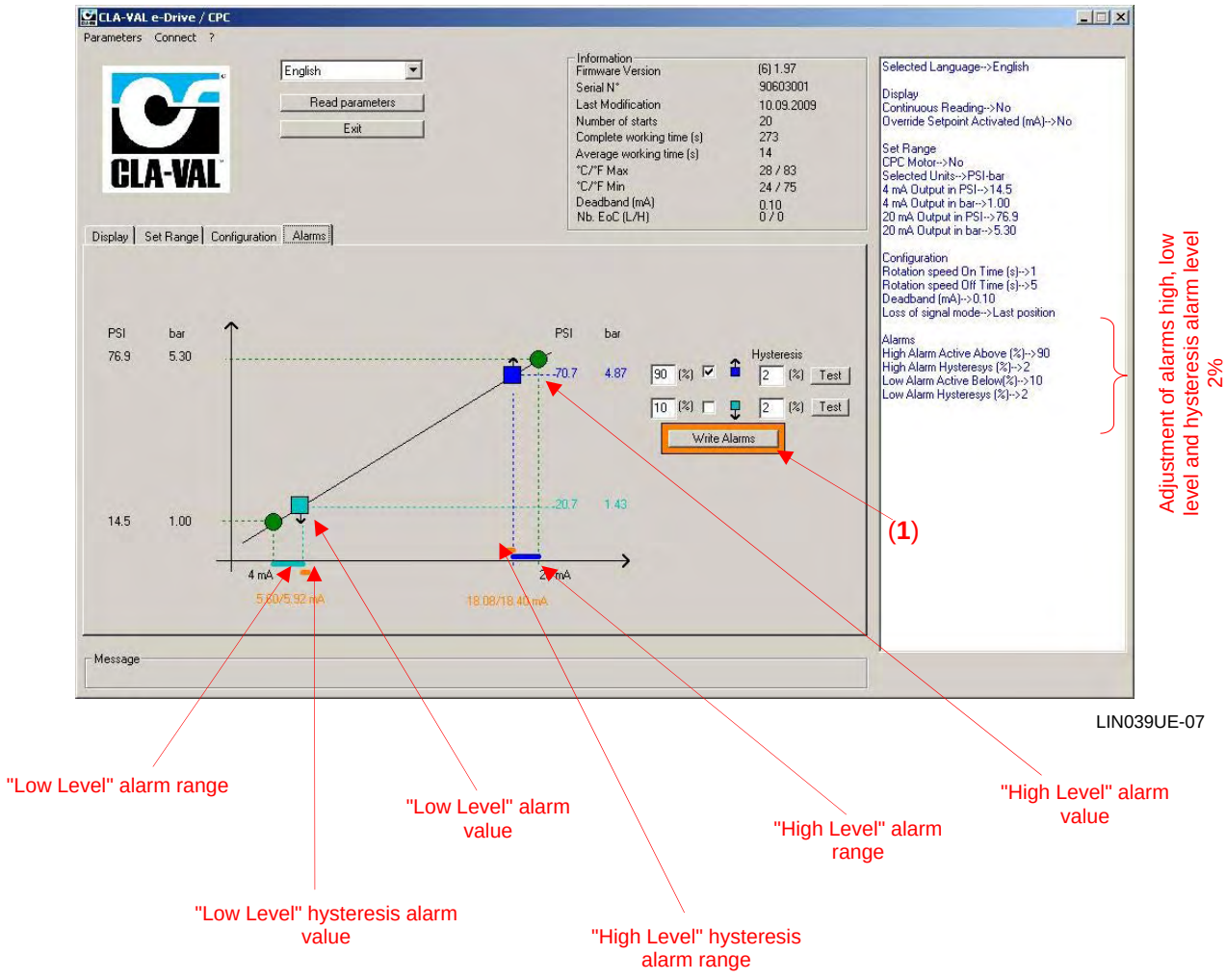
The e-Drive 33 incorporates a ***LOW*** and ***HIGH*** Alarm with an adjustable hysteresis.

Note: The ***LOW*** and ***HIGH*** alarm levels are activated within the range:

- Example:
  10% low alarm = 4 + (10% x 16) = 5.6 mA.
  90% High alarm = 4 + (90% x 16) = 18.4 mA.

- **Hysteresis:**
  The calculation is: 4 + (2% x 16) = 0.32 mA.
  Low alarm hysteresis in this example = 5.6 mA + 0.32 mA = 5.92 mA.
  High alarm hysteresis in this example = 18.4 mA - 0.32 mA = 18.08 mA.

1- Enter the requested percentage, for the alarms and hysteresis.
2- Click on **"Test"** to close or open your contact relay.
3- Click on **"Write Alarms"** (**1**) once your alarm settings are correct.



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5 SOME TIPS

a. After calibration if you want to change the pilot position, use the **"Override setpoint"** option.

b. To generate a calibration report, select **"Parameters"** and then **"Report"**.

- Enter a reference number.
- Click on **"Report"**.

The Software will automatically generate a TXT report file (C:\Program Files\CLA-VAL\e-Drive Setup) including all the calibration settings.

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